PHENIX
MPC NORTH & SOUTH
INSTALLATION PROCEDURE

procedure name

PHENIX Procedure No. 2.5.5.4-26

Revision: A **Date: 3/22/2007**

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approvals

Don Lynch
PHENIX S E & I Date

Cognizant Scientist/Engineer /Activity Manager Date

PHENIX QA/Safety Date

RHIC ES&H Date

REVISION CONTROL SHEET

LETTER	DESCRIPTION	DATE	WRITTEN BY	APPROVED BY	CURRENT OVERSIGHT
A	First Issue (Note: issued as procedure for control purposes. Originally prepared as attachments to separate work permits for North and South Installations.	3/22/2007	D. Lynch	(See appropriate work permits)	D. Lynch
Deactivated	Original installations are complete. Re-activate to re-issue or revise installation procedures when necessary	3/22/2007	D. Lynch	D. Lynch, R. Pisani, P. Giannotti	D. Lynch

I. Installation of MPC South

MPC South Detectors
PHENIX IR, Bldg. 1008

Discussion

A new array of detectors has been designed and built for the PHENIX experiment at the Relativistic Heavy Ion Collider. The design concept for the detectors has been reviewed by appropriate PHENIX technical staff and a safety review by CA safety staff has been conducted during which the concept for this work plan was presented.

The detector is comprised by 8 separate enclosures of 2 generic configurations housing a total of 188 lead tungstate crystals 29 of which are housed in each of 4 wedge shaped corner modules and 18 crystals in each of 4 brick shaped central module. The enclosures provide a light tight environment for the detectors which have dry air supplied in an open loop to maintain a uniform thermal environment. On the exterior of the enclosures in the side facing the IP printed circuit boards are attached, from which signal cables and HV/LV power cables are routed from the front end electronics. LED's are mounted on the opposite face (facing away from IP). The front end electronics are mounted above the center MuTr electronics rack on the "eyebrow".

The detector enclosures will be installed 1 at a time by hand with support from the overhead crane to help support the weight when positioning the module for insertion. The attached diagrams show the order and orientation in which the detector modules are to be inserted.

This work is to be done by fully trained and experienced PHENIX personnel, under the technical supervision of Sal Marino and the engineering cognizance of Don Lynch. The modules will be inserted using an articulated manlift with 2 PHENIX mechanical technicians in the lift to support and insert each module and an additional technician on the ground to operate the crane for load support. The actual mechanical work requires mechanical technician skill of the craft to insert the individual modules, integrate them into a single detector system, align the system to its ultimate position and anchor the assembly at that position.

All persons involved will have appropriate training for working at heights, fall protection and all other relevant training.

Procedure

LOTO the power to the MMS magnet coil at the power supply in1008B. (Pearson)

Assure that the CM is locked in position by locking out the hydraulics to each magnet mover. (Marino**)**

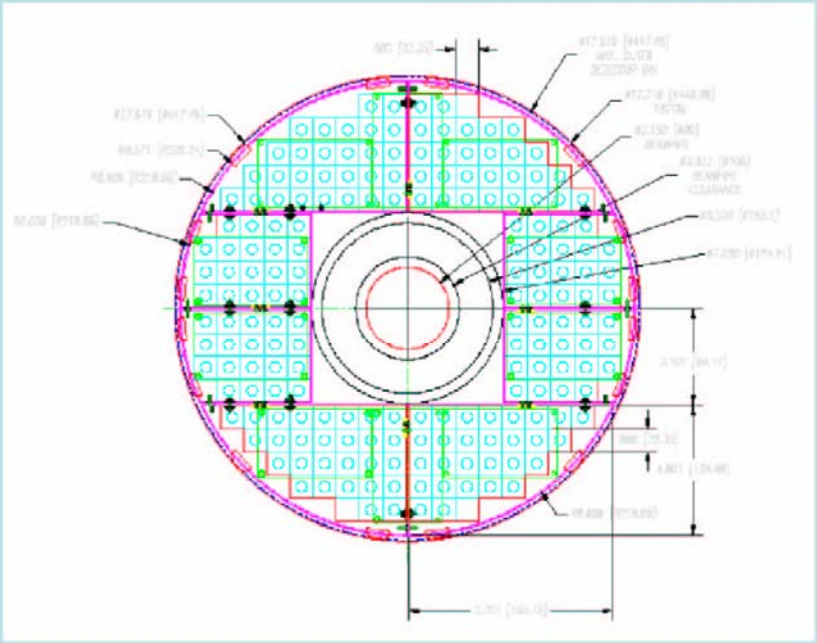
Insert each of the modules individually into the piston cavity using the installation tool shown on the attached sheets and in accordance with the sequence and orientation graphically illustrated on the attached sheets. Maintain extreme care at all times to prevent contact with the beam pipe.

After installing, integrating, positioning and aligning the assembly make sure that all tools and any other foreign matter are removed from the piston hole.

Attach signal and power cables as required and route them into the provided cable tray to the MPC electronics crate.

At this point the MMS magnet may be released from its hydraulics lockout to be moved north to its run position and the detector commissioning may commence.

MPC Installation



8 modules:

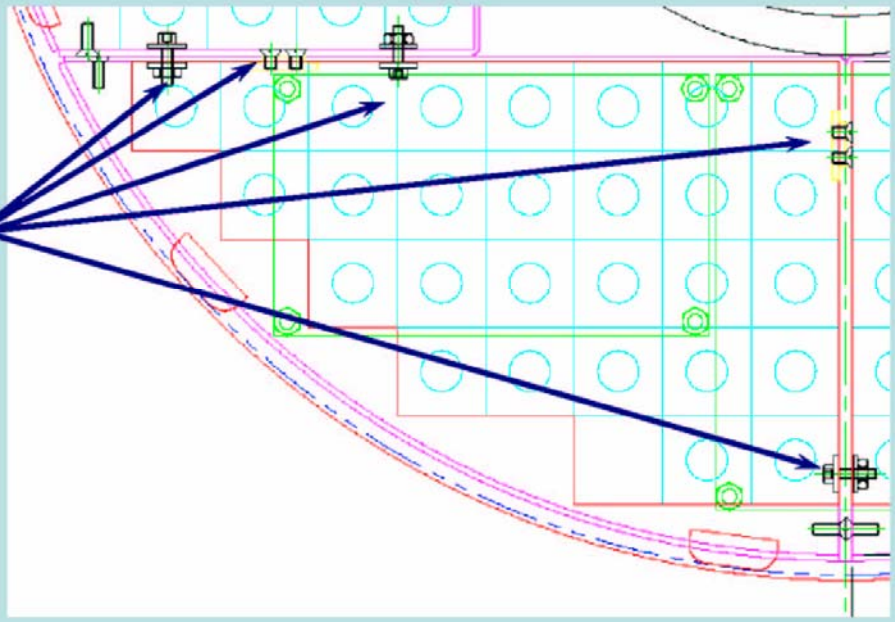
- 4 wedges w/ 29 crystals each
- 4 bricks w/18 crystals each
- 188 crystals total

PHENIX

1/11/2006 DRLynch MPC Installation Procedure

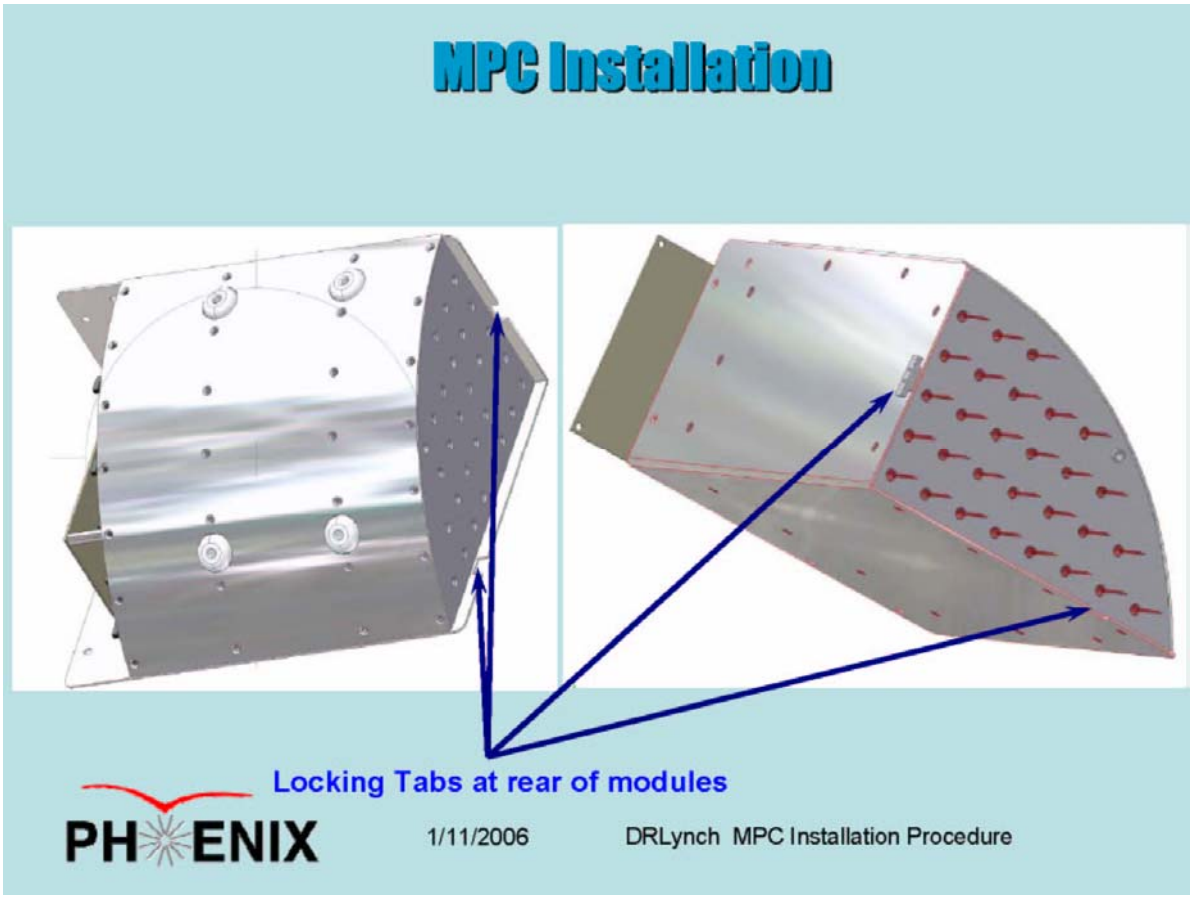
MPC Installation

Modules are attached to adjacent modules with tab/slots at rear and screws at front

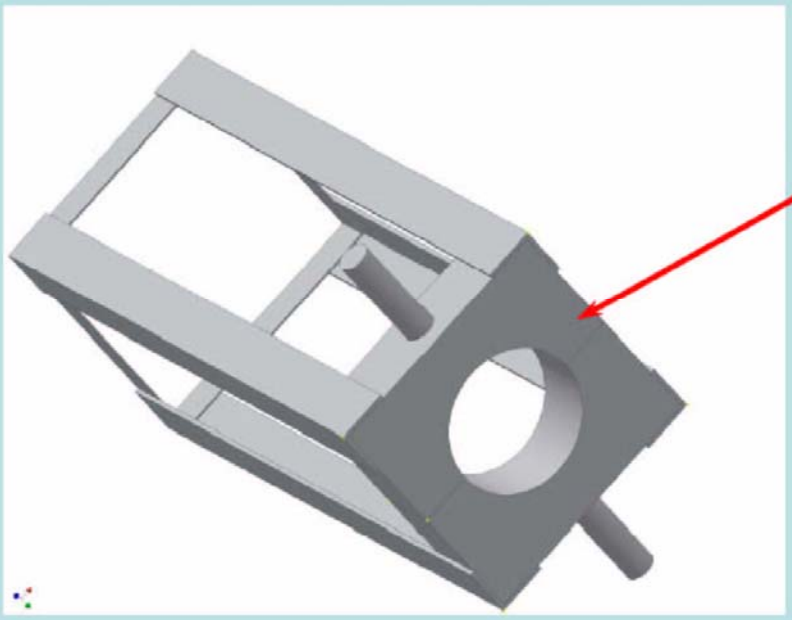


PHENIX

1/11/2006 DRLynch MPC Installation Procedure


MPC Installation
Locking Tabs at rear of modules
PHENIX
1/11/2006
DRLynch MPC Installation Procedure

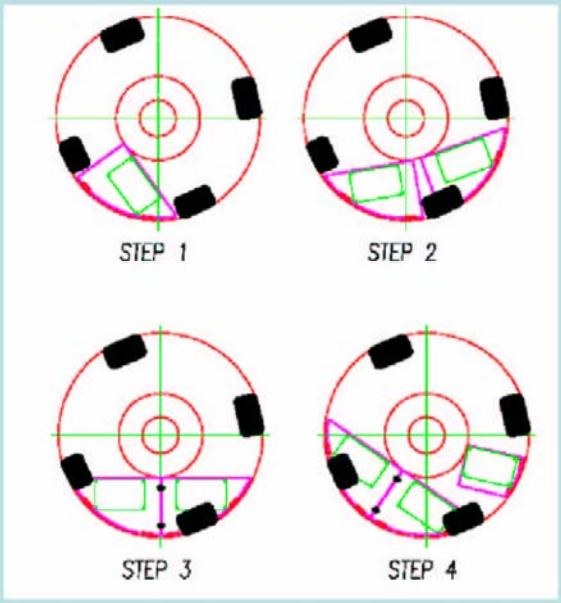
MPC Installation



PHENIX 1/11/2006 DRLynch MPC Installation Procedure

MPC Installation

1. Insert lower-west wedge module



2. Rotate lower-west wedge module counter-clockwise, insert lower-east module

3. Rotate lower wedge modules to normal position

4. Rotate lower wedge modules clockwise, insert below-center west block module

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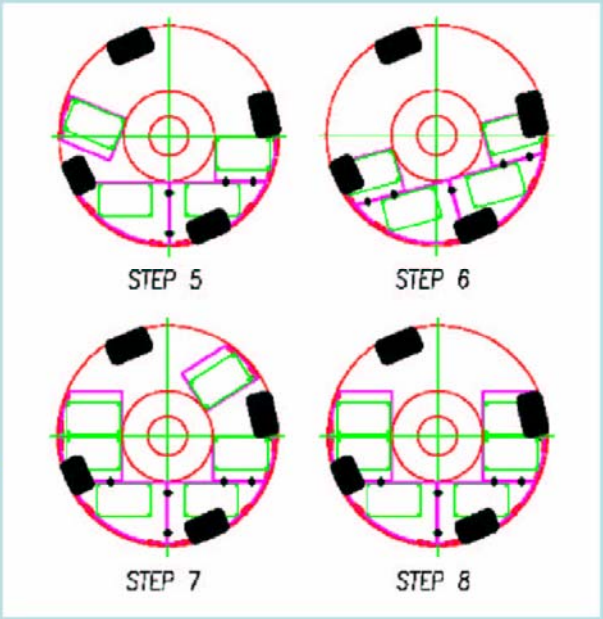
1/11/2006 DRLynch MPC Installation Procedure

MPC Installation

5. Rotate modules back to normal position. Insert below-center east block module



6. Rotate modules counter-clockwise, insert above-center east block module

7. Rotate modules to normal position. Insert babove-center West block module

8. Ready for upper wedge modules

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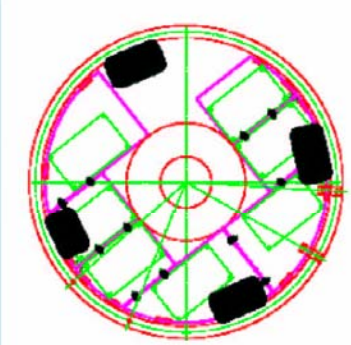
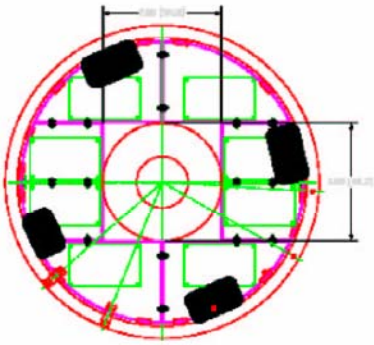
1/11/2006 DRLynch MPC Installation Procedure

MPC Installation

9. Rotate modules counter-clockwise. Insert upper east wedge



STEP 9



STEP 10

10. Rotate modules clockwise, to normal position. Insert upper-west wedge module

11. Connect cables and gas lines, push assembly to back wall of cavity align and lock in position

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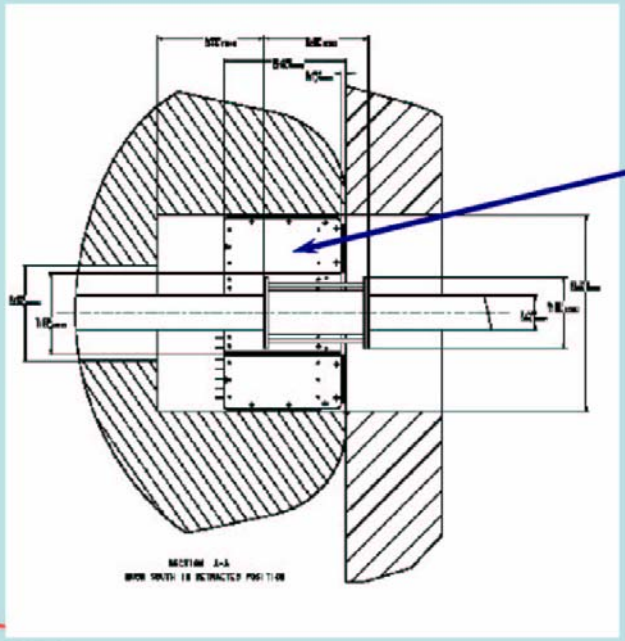
1/11/2006 DRLynch MPC Installation Procedure

MPC Installation



MPC after all modules are installed, before moving back in cavity and before being cabled

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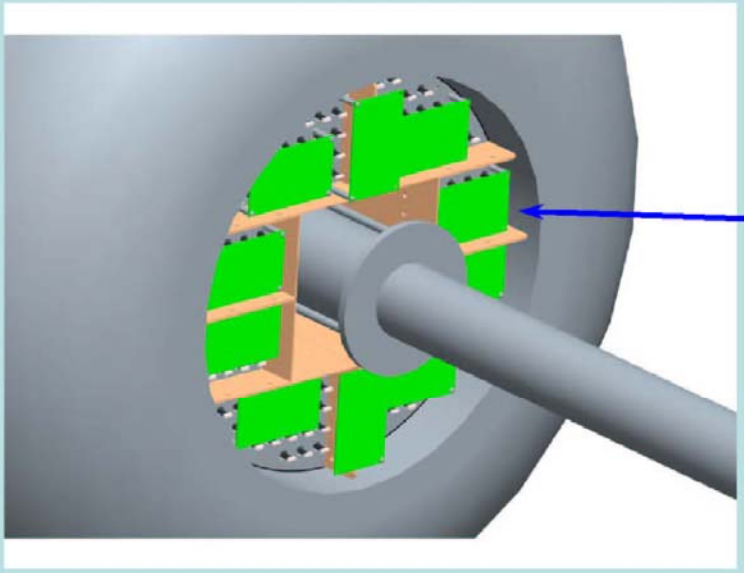
1/11/2006 DRLynch MPC Installation Procedure

MPC Installation



MPC after all modules are installed, before moving back in cavity and before being cabled

(MuTr Station 1 omitted for clarity)

PHENIX 1/11/2006 DRLynch MPC Installation Procedure

II. Installation of MPC North

MPC North Detector
PHENIX IR, Bldg. 1008

Discussion

A new array of detectors has been designed and built for the PHENIX experiment at the Relativistic Heavy Ion Collider. The design concept for the detectors has been reviewed by appropriate PHENIX technical staff and a safety review by CA safety staff has been conducted during which the concept for this work plan was presented.

The detector is comprised by 6 separate enclosures of 2 generic configurations housing a total of 188 lead tungstate crystals 29 of which are housed in each of 4 wedge shaped corner modules and 18 crystals in each of 2 brick shaped central module. The enclosures provide a light tight environment for the detectors which have dry air supplied in an open loop to maintain a uniform thermal environment. On the exterior of the enclosures in the side facing the IP printed circuit boards are attached, from which signal cables and HV/LV power cables are routed from the front end electronics. LED's are mounted on the opposite face (facing away from IP). The front end electronics are mounted on the east side of the MuID North rack ".

The detector enclosures will be installed empty, 1 at a time by hand. After all empty enclosures are installed, individual detector modules with photodiodes and their holders attached and wrapped in light tight covers, will be stacked into each enclosure. As each enclosure is filled with modules, the cables from the photo diodes will be fit through an array of openings, one per module, in the enclosures front face plate. The face plate will then be attached to the enclosure body. Standoffs will then be mounted and distribution interface printed circuit board attached. This will be repeated until all of the enclosures have been populated, wired, enclosed and interfaced. Finally, flexible piping for dray air supply will be attached and power/signal distribution cabling attached.

This work is to be done by fully trained and experienced PHENIX personnel, under the technical supervision of Sal Marino and the engineering cognizance of Don Lynch (mechanical) and John Haggerty (electrical). The actual mechanical and electrical work requires mechanical/electrical technician skill of the craft to

All persons involved will have appropriate training for working at heights, fall protection and all other relevant training.

Procedure

Caution: During all phases of the work described herein, maintain extreme care at all times to prevent contact with the beam pipe.

1. LOTO the power to the MMN magnet coil at the power supply in1008B. (Pearson)

2. Assure that the CM is locked in its southern most position by locking out the hydraulics to each magnet mover. (Marino**)**

3. Assure that all power to the detector is locked out (Haggerty)

   Note: Only PHENIX technicians fully trained and approved for this operation by the cognizant engineers and technical supervisor may operate the articulated arm man lift. A maximum of 2 people may perform the following work in the manlift bucket and a third person shall be in the PHENIX IR, aware of the work being performed, and within communication distance at all times. The passenger in the manlift shall be fully trained as indicated above and shall be approved for this work by the cognizant engineers and technical supervisor.

4. Using the articulated arm manlift, carefully driven to avoid any possibility of contact with adjacent detector components or the beampipe to access the MMN piston cavity.

5. Insert each of the enclosures individually into the piston cavity by hand in accordance with the sequence and orientation graphically illustrated on the attached sheets.

6. Populate, wire, enclose and interface the individual modules as indicated above. Maintain extreme care at all times to prevent contact with the beam pipe.

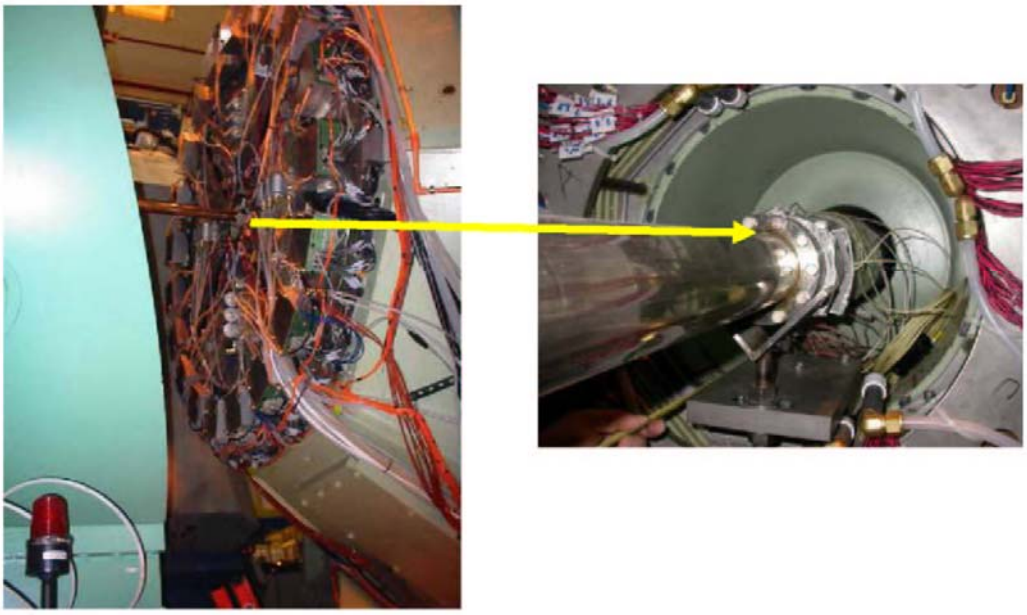
7. Align the system to its ultimate position and anchor the assembly at that position.

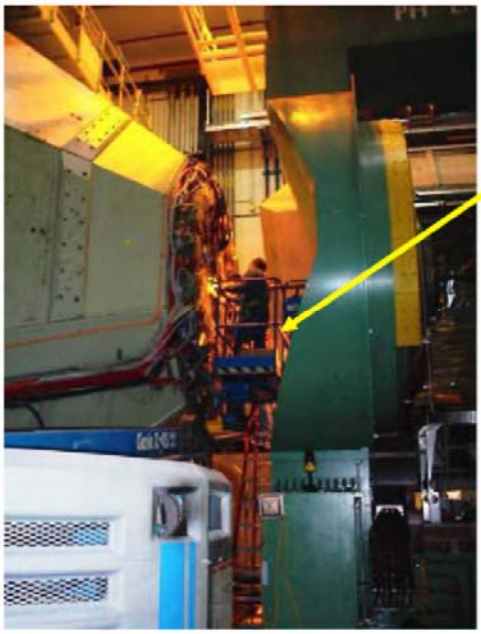
8. Attach signal and power cables as required and route them into the provided cable tray to the MPC North electronics crate (see attached cable routing plan)

9. After installing, integrating, positioning and aligning the assembly make sure that all tools and any other foreign matter are removed from the piston hole.

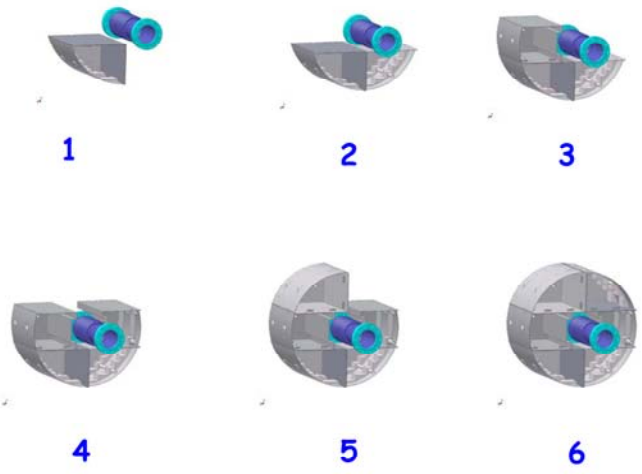
At this point detector re-commissioning may commence.

MPC North will be installed in the Muon Magnet North piston cavity





MPC North to be installed from man lift, as South version was.

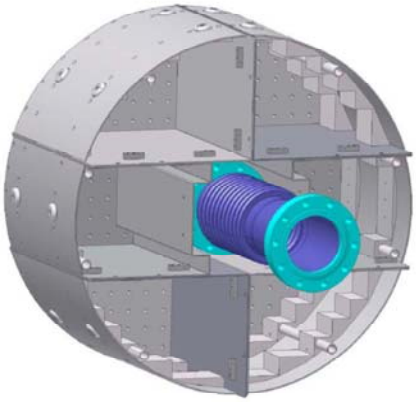


Empty sextants are installed first. LED's and LED board are already attached.

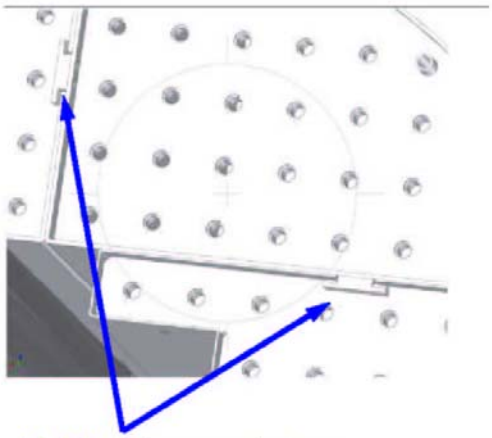
Then modules are individually inserted.

Next APD cable is attached then snaked through cover which is attached.

Finally, standoffs and signal pcbs are attached, wired and routed to MPC N rack.

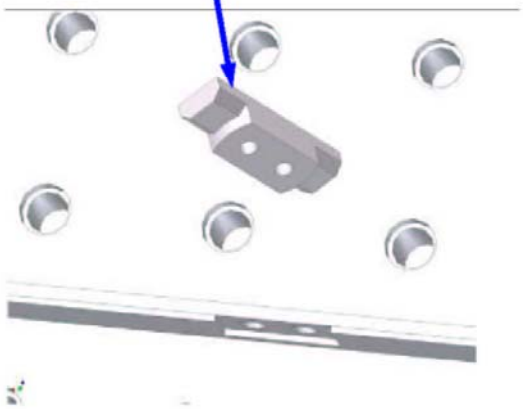


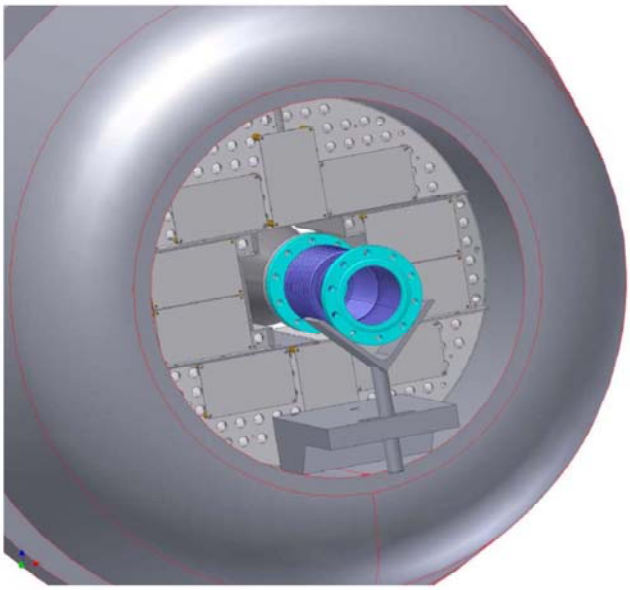
All of the empty sectors are installed before the crystals are inserted



Modules interconnect at rear using tabs as in MPC S

Tabs for MPC N modified for increase clearance and rounded for easy locating and self centering





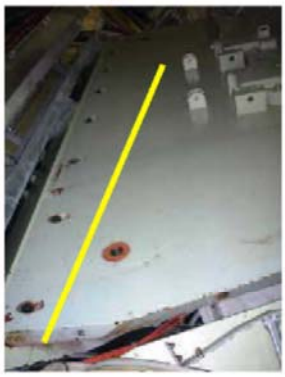
MPC North mechanical assembly complete ready for cabling

MPC North Cable Routing

MPC North Cable Routing

1

2



3

4

1. From MuID rack to NMM
2. Up NMM vertical l/shade
3. Over top of NMM to center, then down
4. Under scaffold platform
5. down top lampshade (like MPC S)

5